**WSU Step by Step Guide on Standard Operating Procedures (SOPs) and**

**Animal Hazard Agent Form II Chemical (AHAF II) Requirements for Chemicals Use in Research**

**Step 1:** Identify the hazards for the chemical of interest. This can be accomplished using the following resource:

1. GHS compliant Safety Data Sheet (SDS): Section 2 (Hazard information) and section 11 (Toxicological information)

And:

1. PubChem – A chemistry database at the National Institutes of Health (NIH)
2. European Chemical Agency chemical database

**Step 2:** Refer to Table 01 (page 2) and the flow chart below to identify hazardous chemical type [High Risk, Particularly Hazardous Substance (PHS) and Hazardous (non-PHS)] and the type of SOP is required.

**High Risk Chemical (PHS with extremely hazardous characteristics)**

* Develop lab specific SOP
* Approve SOP by PI
* Approve SOP by WSU-CSC if chemical of interest is:

GHS category 1 Acute toxin (dermal and/or inhalation) OR

Refer to WSU-CSC by Chemical Hygiene Officer

* Provide an updated, signed copy of SOP to OEHS

Chemical of interest possesses one or more of the hazards listed in Table 01 - Column A

**YES**

**NO**

**NO**

Chemical of interest possesses one or more of the hazards listed in Table 01 - Column C

**YES**

**Particularly Hazardous Substance (PHS)**

* Develop lab specific SOP
* Approve SOP by PI

**NO**

Chemical of interest possesses one or more of the hazards listed in Table 01 - Column B

**Hazardous Chemical (non-PHS)**

* Follow generic hazard class SOP or guideline

**YES**

* No SOP required
* Follow manufacturer safety guidelines and prudent lab safety practices
* Contact OEHS (313 577 1200) if concerned about hazards not identified through this process

**Step 3:** If the chemical of interest is being used in animal models (IACUC approved) and possesses hazards listed in one or more of the GRAY boxes in Table 01 (page 2) an AHAF II must be attached to your IACUC protocol and provided to the DLAR.

**Table 01 - WSU Matrix to Develop SOPs (Lab specific or Generic), Guidelines or Animal Hazard Agent Form Chemical (AHAF II) for High Risk Chemicals,**

**Particularly Hazardous Substances (PHS), or Hazardous Chemicals (non-PHS)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Designation or Description** | **Particularly Hazardous Substances (PHS)** | | | **C. Hazardous Chemicals (non-PHS)** | |
| **A. High Risk Chemicals \*** | **B. PHS** | |
| *Action for work in* ***Lab***  | *Lab specific SOP approved by PI, on file with OEHS* | *Lab specific SOP approved by PI* | | *Follow Generic Hazard Class SOP or Guidelines* | |
| *Action for Handling chemicals used in*  ***IACUC protocols***  | *If box below is GRAY: an IACUC reportable chemical, attach an Animal Hazard Agent Form (AHAF II) chemical for IACUC eprotocol* | | | | |
| ***GHS Hazard Class ↓*** | **GHS Category or Notes** | | | | |
| Acute toxicity – *dermal or inhalation* | 1 – *WSU CSC must approve SOP* | 2 | | 3 | 4 |
| Acute toxicity – *oral* |  | 1 | | 2 or 3 | |
| Carcinogenicity |  | 1A or 1B | | 2 | |
| Reproductive toxicity (Fetal or Fertility) |  | 1A or 1B | | 2 | |
| Germ cell mutagenicity |  |  | | 1A, 1B, 2 | |
| Specific Target Organ toxicity (STOT) |  | Single Exposure (SE): 1 | | Repeated Exposure (RE): 1 | SE: 2 or RE: 2 |
| Sensitization (respiratory or skin) |  | Respiratory: 1 or 1A | Skin: 1 or 1A | Respiratory: 1B | Skin: 1B |
| STOT: SE; Respiratory tract irritation |  |  | | 3 | |
| Skin Corrosion/irritation |  |  | | 1A, 1B, 1C | |
| Serious eye damage/eye irritation |  |  | | 1 or 2A | |
| Aspiration hazard | 1 |  | |  | |
| In contact with water, emit flammable gases |  | 1, 2 | | 3 | |
| Pyrophoric liquid or solid | 1 |  | |  | |
| Explosives | Unstable or Division 1.1 – 1.3 |  | | Division 1.4 – 1.6 | |
| Self-reactive or Organic peroxides | Type A | Type B | | Type C, D, E, F, or G | |
| Self-heating | 1 |  | | 2 | |
| Flammable |  |  | | Liquid, Solid, Gas or aerosol: 1 – 3 | |
| Oxidizing |  | Liquid or solid 1 | | Liquid or solid 2 - 3, gas: 1 – 3 | |
| Gases under pressure | Refrigerated liquefied gases |  | | Gases under pressure unless High Risk | |
| Corrosive to Metals |  |  | | 1 | |
| ***European Union Hazard Classes – Non-GHS ↓*** | Contact with water yields toxic gas | Contact with acids yields (very) toxic gas | | Toxic by eye contact | |
|  | Reacts violently with water |  | | May form explosive peroxides | |
|  | Explosive when dry; Explosive with or without air contact |  | |  | |
| ***Other Non-GHS Hazard Types ↓*** |  |  | |  | |
| Other Carcinogen Designations |  | NTP Known; IARC Group 1; OSHA listed carcinogens; GHS 2 AND IARC 2 AND NTP Reasonably Anticipated | | NTP Reasonably Anticipated IARC 2A or 2B | |
| NIOSH Hazardous Drugs |  |  | | NIOSH hazardous drugs not classified above | |
| Nanoparticles | All types |  | |  | |
| Novel chemicals |  | Hazardous unknown | | Limited hazardous data | |
| OSHA Hazard Classes | Pyrophoric gas |  | | Simple asphyxiant | |

\* May be referred to CSC by Chemical Hygiene Officer (CHO)

**Examples**

1. Hydrofluoric acid used in chemistry lab for synthesis
2. 2-Mercaptoethanol used in biology lab for cell culture
3. Tamoxifen solution formulated in med school lab and administrated to mice housed in DLAR facility
4. Ethyl alcohol used in chemistry lab for synthesis
5. Formaldehyde used as a fixative
6. Tert-Butyllithium solution used in a physics lab and its use was referred to CSC by Chemical Hygiene Officer (CHO)
7. Sodium Chloride used in chemistry lab for synthesis

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Chemical name** | **SDS section 2: Hazard information** | **First column (Column order A to C) in Table 01 in which one or more of the hazards listed** | **Type of Standard Operating Procedure (SOP)** | **Chemical is:**   1. **Category 1 acute dermal or inhalation toxin? OR** 2. **Referred to CSC by Chemical Hygiene Officer?** | **DLAR staff is exposed to animals administrated with the chemical AND the chemical possess hazard(s) listed in one or more of the gray boxes listed in Table 01?** |
| Hydrofluoric acid | Acute toxicity, Oral (Category 2)  Acute toxicity, Inhalation (Category 2)  **Acute toxicity, Dermal (Category 1)**  Skin corrosion (Category 1B)  Serious eye damage (Category 1) | Column A | PI approved Lab Specific SOP on file with OEHS | YES – Dermal toxin  WSU CSC must approve SOP | NO |
| 2-Mercaptoethanol | Flammable liquids (Category 4)  Acute toxicity, Oral (Category 3)  Acute toxicity, Inhalation (Category 3)  Acute toxicity, Dermal (Category 2)  Skin irritation (Category 2)  Serious eye damage (Category 1)  **Skin sensitisation (Sub-category 1A)**  Reproductive toxicity (Category 2)  Specific target organ toxicity - repeated exposure, Oral (Category 2), Liver, Heart | Column B | PI approved Lab Specific SOP | NO | NO |
| Tamoxifen | **Carcinogenicity (Category 1A)**  **Reproductive toxicity (Category 1B)** | Column B | PI approved Lab Specific SOP | NO | YES  AHAF II Chemical form is required |
| Ethyl Alcohol | **Flammable liquids (Category 2)**  **Eye irritation (Category 2A)** | Column C | Generic Hazard Class SOP or Guideline |  |  |
| Formaldehyde | Flammable liquids (Category 3)  Acute toxicity, Oral (Category 3)  Acute toxicity, Inhalation (Category 3)  Acute toxicity, Dermal (Category 3)  Skin corrosion (Category 1B)  Serious eye damage (Category 1)  **Skin sensitisation (Category 1)**  Germ cell mutagenicity (Category 2)  **Carcinogenicity (Category 1B)** | Column B | PI approved Lab Specific SOP | NO | NO |
| Tert-Butyllithium solution | Flammable liquids (Category 2)  **Pyrophoric liquids (Category 1)**  Substances and mixtures, which in contact with water, emit flammable gases (Category 1)  Skin corrosion (Category 1B)  Serious eye damage (Category 1)  Specific target organ toxicity - single exposure (Category 3), Central nervous system  **Aspiration hazard (Category 1)** | Column A | PI approved Lab Specific SOP SOP on file with OEHS | YES – Referred to CSC by CHO  WSU CSC must approve SOP | NO |
| Sodium Chloride | Not a hazardous substance or mixture | None | No SOP required, follow SDS safety guidelines | NO | NO |